## Dell Inc.

**PowerEdge R340 (Intel Xeon E-2146G, 3.50GHz)**

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_base = 36.3</td>
<td>CPU2017 License: 55</td>
</tr>
<tr>
<td>SPECrate2017_fp_peak = 35.1</td>
<td>Test Sponsor: Dell Inc.</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E-2146G</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>4500</td>
</tr>
<tr>
<td>Nominal</td>
<td>3500</td>
</tr>
<tr>
<td>Enabled</td>
<td>6 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>12 MB I+D on chip per core</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>64 GB (4 x 16 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP3</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 18.0.2.20180210 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.20180210 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 1.0.1 released Oct-2018</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>
## SPEC CPU2017 Floating Point Rate Result

**Dell Inc.**

PowerEdge R340 (Intel Xeon E-2146G, 3.50GHz)

**SPECrate2017_fp_base = 36.3**

**SPECrate2017_fp_peak = 35.1**

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>Dell Inc.</td>
<td>Dec-2018</td>
<td>Apr-2018</td>
</tr>
</tbody>
</table>

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>12</td>
<td>1709</td>
<td>70.4</td>
<td>1713</td>
<td>70.3</td>
<td>1710</td>
<td>70.4</td>
<td>1709</td>
<td>70.4</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>12</td>
<td>414</td>
<td>36.7</td>
<td>415</td>
<td>36.6</td>
<td>418</td>
<td>36.4</td>
<td>425</td>
<td>35.7</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>12</td>
<td>332</td>
<td>34.3</td>
<td>336</td>
<td>33.9</td>
<td>336</td>
<td>34.0</td>
<td>331</td>
<td>34.4</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>12</td>
<td>1857</td>
<td>16.9</td>
<td>1841</td>
<td>17.1</td>
<td>1843</td>
<td>17.0</td>
<td>1862</td>
<td>16.9</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>12</td>
<td>541</td>
<td>51.8</td>
<td>547</td>
<td>51.2</td>
<td>545</td>
<td>51.4</td>
<td>462</td>
<td>60.6</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>12</td>
<td>745</td>
<td>17.0</td>
<td>745</td>
<td>17.0</td>
<td>744</td>
<td>17.0</td>
<td>744</td>
<td>17.0</td>
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<tr>
<td>521.wrf_r</td>
<td>12</td>
<td>857</td>
<td>31.4</td>
<td>857</td>
<td>31.4</td>
<td>858</td>
<td>31.3</td>
<td>851</td>
<td>31.6</td>
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<tr>
<td>526.blender_r</td>
<td>12</td>
<td>374</td>
<td>48.8</td>
<td>375</td>
<td>48.7</td>
<td>376</td>
<td>48.6</td>
<td>375</td>
<td>48.7</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>12</td>
<td>497</td>
<td>42.2</td>
<td>504</td>
<td>41.7</td>
<td>472</td>
<td>44.5</td>
<td>503</td>
<td>41.7</td>
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<tr>
<td>538.imagick_r</td>
<td>12</td>
<td>265</td>
<td>113</td>
<td>265</td>
<td>113</td>
<td>265</td>
<td>113</td>
<td>401</td>
<td>74.4</td>
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<tr>
<td>544.nab_r</td>
<td>12</td>
<td>261</td>
<td>77.4</td>
<td>262</td>
<td>77.2</td>
<td>259</td>
<td>77.9</td>
<td>301</td>
<td>67.2</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>12</td>
<td>2155</td>
<td>21.7</td>
<td>2156</td>
<td>21.7</td>
<td>2157</td>
<td>21.7</td>
<td>2171</td>
<td>21.5</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>12</td>
<td>1597</td>
<td>11.9</td>
<td>1600</td>
<td>11.9</td>
<td>1605</td>
<td>11.9</td>
<td>1584</td>
<td>12.0</td>
</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 36.3**

**SPECrate2017_fp_peak = 35.1**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

---

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

### General Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32/:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Transparent Huge Pages enabled by default

Prior to runcpu invocation

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

Dell Inc.

PowerEdge R340 (Intel Xeon E-2146G, 3.50GHz)

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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Dec-2018
Hardware Availability: Dec-2018
Software Availability: Apr-2018

General Notes (Continued)

Filesystem page cache synced and cleared with:
sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numacl i.e.:
numactl --interleave=all runcpu <etc>

Platform Notes

BIOS settings:
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-bx7m Wed Dec 12 17:19:03 2018

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) E-2146G CPU @ 3.50GHz
 1 "physical id"s (chips)
 12 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 6
siblings : 12
physical 0: cores 0 1 2 3 4 5

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 12
On-line CPU(s) list: 0-11
Thread(s) per core: 2
Core(s) per socket: 6
Socket(s): 1

(Continued on next page)
Dell Inc.
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Tested by: Dell Inc.
Test Date: Dec-2018
Hardware Availability: Dec-2018
Software Availability: Apr-2018

Platform Notes (Continued)

NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2146G CPU @ 3.50GHz
Stepping: 10
CPU MHz: 3757.597
CPU max MHz: 4500.0000
CPU min MHz: 800.0000
BogoMIPS: 7007.96
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 12288K
NUMA node0 CPU(s): 0-11
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epbi invpcid_single pln pts
dtherm hwp hwp_act_window hwp_epp intel_pt rsb_ctxsw spec_ctrl stibp ret在北京
kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep
bmi2  3dnowprefetch ida arat epbi invpcid_single pln pts dtherm hwp hwp_act_window hwp_epp intel_pt
rsb_ctxsw spec_ctrl stibp reteline kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase
 tsc_adjust bmi1 hle avx2 smep bmi2  3dnowprefetch ida arat epbi invpcid_single pln pts
dtherm hwp hwp_act_window hwp_epp intel_pt rsb_ctxsw spec_ctrl stibp reteline kaiser
 tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2

From /proc/cpuinfo cache data
  cache size: 12288 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
  node 0 size: 64276 MB
  node 0 free: 63814 MB
  node distances:
  node 0
  0: 10

From /proc/meminfo
  MemTotal: 65818632 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

SUSE Linux Enterprise Server 12 SP3

(Continued on next page)
Dell Inc.
PowerEdge R340 (Intel Xeon E-2146G, 3.50GHz)

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Tested by: Dell Inc.

Test Date: Dec-2018
Hardware Availability: Dec-2018
Software Availability: Apr-2018

Platform Notes (Continued)

From /etc/*release* /etc/*version*

SuSE-release:
- SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 3
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.

os-release:
- NAME="SLES"
- VERSION="12-SP3"
- VERSION_ID="12.3"
- PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
- ID="sles"
- ANSI_COLOR="0;32"
- CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
- Linux linux-bx7m 4.4.126-94.22-default #1 SMP Wed Apr 11 07:45:03 UTC 2018 (9649989)
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Dec 12 09:26 last=5

SPEC is set to: /home/cpu2017
- Filesystem     Type   Size  Used Avail Use% Mounted on
- /dev/sda2      xfs    300G  16G  285G  6% /

Additional information from dmidecode follows. WARNING: Use caution when you interpret
this section. The 'dmidecode' program reads system data which is "intended to allow
hardware to be accurately determined", but the intent may not be met, as there are
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
- BIOS Dell Inc. 1.0.1 10/19/2018
- Memory:
  - 3x 00AD000000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
  - 1x 00AD000000A07 HMA82GU7CJR8N-VK 16 GB 2 rank 2666

(End of data from sysinfo program)
Dell Inc.
PowerEdge R340 (Intel Xeon E-2146G, 3.50GHz)

SPEC CPU2017 Floating Point Rate Result

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CPU2017 License: 55
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Tested by: Dell Inc.

Test Date: Dec-2018
Hardware Availability: Dec-2018
Software Availability: Apr-2018

Compiler Version Notes

==============================================================================
CC 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CC 519.lbm_r(peak) 538.imagick_r(peak) 544.nab_r(peak)
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==============================================================================

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CXXC 508.namd_r(base) 510.parest_r(base)
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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CC 511.povray_r(base) 526.blender_r(base)
==============================================================================
icpc (ICC) 18.0.2 20180210
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icc (ICC) 18.0.2 20180210
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CC 511.povray_r(peak) 526.blender_r(peak)

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Compiler Version Notes (Continued)

FC 507.cactuBSSN_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

FC 507.cactuBSSN_r(peak)
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CC 521.wrf_r(base) 527.cam4_r(base)
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icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

CC 521.wrf_r(peak) 527.cam4_r(peak)
------------------------------------------------------------------------------
(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

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CPU2017 License: 55
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Hardware Availability: Dec-2018
Software Availability: Apr-2018

Compiler Version Notes (Continued)

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
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Base Optimization Flags

C benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

C++ benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

Fortran benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:  
icc -m64 -std=c11

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64

Benchmarks using both Fortran and C:  
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:  
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:  
icpc -m64 icc -m64 -std=c11 ifort -m64
**SPEC CPU2017 Floating Point Rate Result**

**Dell Inc.**

PowerEdge R340 (Intel Xeon E-2146G, 3.50GHz)

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</tbody>
</table>

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**
- `-prof-gen(pass 1)`  `-prof-use(pass 2)`  `-ipo`  `-xCORE-AVX2`  `-O3`
- `-no-prec-div`  `-qopt-prefetch`  `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`

**C++ benchmarks:**
- `-prof-gen(pass 1)`  `-prof-use(pass 2)`  `-ipo`  `-xCORE-AVX2`  `-O3`
- `-no-prec-div`  `-qopt-prefetch`  `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`

**Fortran benchmarks:**
- `-prof-gen(pass 1)`  `-prof-use(pass 2)`  `-ipo`  `-xCORE-AVX2`  `-O3`
- `-no-prec-div`  `-qopt-prefetch`  `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`  `-auto`  `-nostandard-realloc-lhs`

Benchmarks using both Fortran and C:
- `-prof-gen(pass 1)`  `-prof-use(pass 2)`  `-ipo`  `-xCORE-AVX2`  `-O3`
- `-no-prec-div`  `-qopt-prefetch`  `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`  `-auto`  `-nostandard-realloc-lhs`

Benchmarks using both C and C++:
- `-prof-gen(pass 1)`  `-prof-use(pass 2)`  `-ipo`  `-xCORE-AVX2`  `-O3`
- `-no-prec-div`  `-qopt-prefetch`  `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`

Benchmarks using Fortran, C, and C++:
- `-prof-gen(pass 1)`  `-prof-use(pass 2)`  `-ipo`  `-xCORE-AVX2`  `-O3`
- `-no-prec-div`  `-qopt-prefetch`  `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`  `-auto`  `-nostandard-realloc-lhs`

The flags files that were used to format this result can be browsed at


You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml

### SPEC CPU2017 Floating Point Rate Result

**Dell Inc.**  
PowerEdge R340 (Intel Xeon E-2146G, 3.50GHz)  

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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  

**Test Date:** Dec-2018  
**Hardware Availability:** Dec-2018  
**Software Availability:** Apr-2018

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